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PHYSIOLOGY CHANGES IN PREGNANCY

Uterus: 00:01:45

- Uterine size
  - Pre-pregnancy – 50gm
  - At term – 1100 gm
  - Post pregnancy – 100gm
- Cause: - Due to hypertrophy & hyperplasia of cells.
- Hypertrophy >>> hyperplasia → 12 weeks

Supine hypotension syndrome / vena caval syndrome

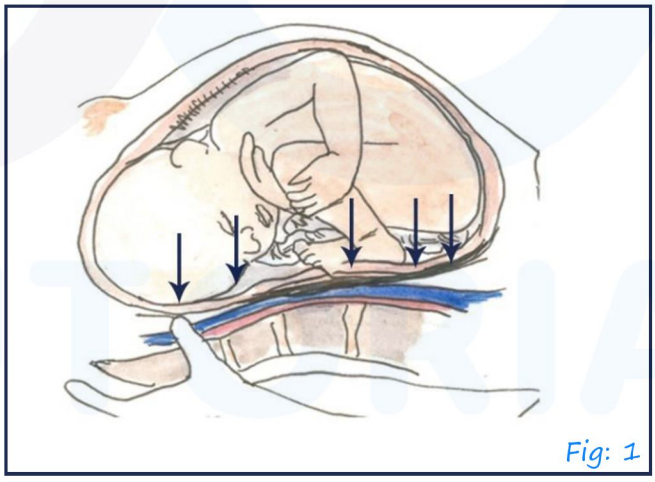

Fig: 1

- In supine position, the gravid uterus will exert pressure on IVC

↓

↓ Venous return

↓

↓ C.O

Hypotension

↓ Flow to uterus

↓

Fetal distress

Treatment: Left lateral position (to not lie in supine position)

Q. a 36 weeks pregnant female came to emergency department with complaints of difficulty in breathing while lying. She feels comfortable when in sitting position and moving to side. What is the likely cause in this scenario?

A. IVC Compression

B. SVC Compression

C. IUGR

D. Heavy meal

- PH = more acidic

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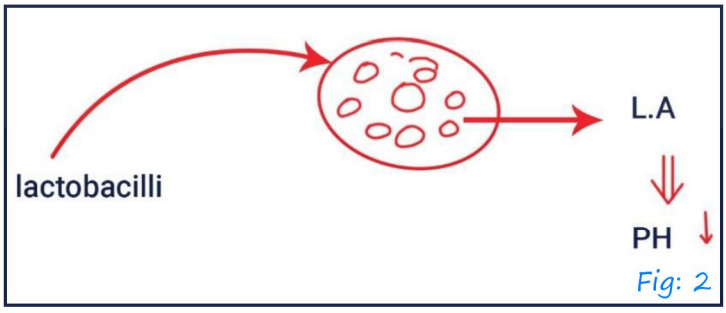

Fig: 2

Q: Most common vaginitis in pregnancy vaginitis associated with acidic PH → CANDIDIASIS

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Breast changes 00:09:41

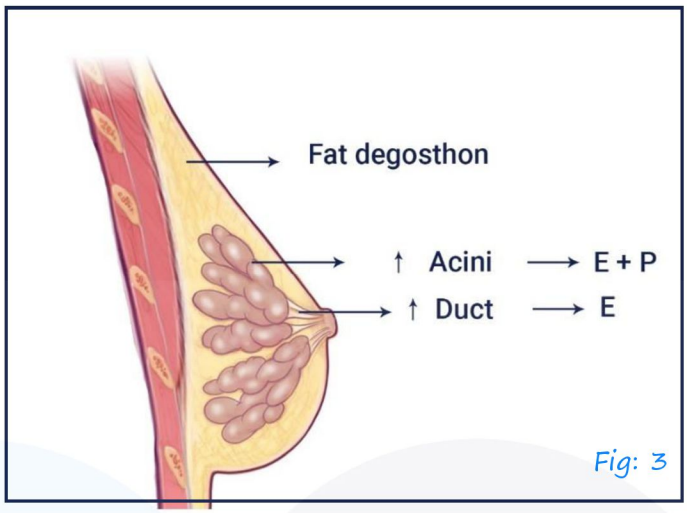

Fig: 3

In above image change degosthon to 'deposition'

- Fat deposition
- ↑ Acini (estro + < progesterone)
- ↑ Montogomery tubercles (modified sebaceous glands)
- ↑ Size, ↑ pigmentation

Skin changes 00:11:57

Fig: 4

Q. Identify the condition?

Fig: 5

a. Linea nigra

b. Stria gravidum

c. Cloasma

d. Linea alba

Ans: A

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Metabolic changes 00:14:04

i. Thyroid metabolism

Thyroid requirement	→	↑↑
Iodine requirement	→	↑↑
Size	→	↑↑
T4 (TSH, HCG-similar α receptor)	→	↑↑↑
TSH	→	↓↓
TBG	→	↑↑↑
Free T4	→	Same

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- T3, T4 can cross placenta, but not TSH
- TSH levels
  - 1st Trimester = 2.5 mIU/L
  - 2nd Trimester = 3 mIU /L
  - 3rd Trimester = 3 mIU /L

ii. Calcium metabolism

Increase	Decrease	Unchange
• Ca^{+2} requirement • Vitamin D level • Calcitonin	S. Calcium	• Ionised Ca^{+2} • PO4

- Ca+2 requirement = 1200mg/day
- Vitamin D = 400 IU/D → 10 µg

iii. Protein metabolism

Pregnancy is an anabolic state

Positive N2 balance

↓

Protein gain

↓

A.A break down suppressed → Blood Urea – falls;,

uric acid creatinine – unchanged or fall

iv. lipid metabolism

- ↑↑ Insulin → lipid (fat) deposition
- 3rd Trimester → lipolysis

CVS changes 00:25:00

Increases	Decrease	Same
Heart rate	PVR	JVP
Stroke volume	SBP	CVP
CO	DBP	
Heart size		
Uterine blood flow		

Danger period - CO max in PP > 2nd stage > 28-32 weeks

Murmur

- S1 – loud = exaggerated splitting
- S2 – normal
- S3 – positive
- S4 – X

  ESM (Ejection systole)

  Pan systolic murmur
- Pathological = Diastolic murmur

  Grade > 3/6

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Hematological changes 00:30:00

- Blood volume - ↑↑↑
- Plasma - ↑↑
- RBC - ↑↑

Physiological anemia ↓ d/t hemodilution

- Clotting factors - ↑↑ → except 13, 11
- Antithrombin
- Protein - C, S

↓↓

- Fibrinogen- Increases
- ESR, CRP- ↑
- Hb, HCT ↓, ↓ → physiological anemia
- HB mass - ↑↑
- TLC - ↑
- PLT - ↓ → Gestational thrombocytopenia
- S. Iron concentration - ↓↓
- S. Ferritin - ↓
- TIBC - ↑
- MCHC - Same
- MCV - ↑

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Q. Which of the coagulation factor decreases in pregnancy?

A. Factor 2

B. Factor 8

C. Factor 11

D. Factor 9

Ans: C

Plasma protein 00:37:44

- All proteins – estrogen - ↑↑
- Globulin – TBG, SHBG
- Albumin - ↓↓
- A; G – 1.1

Inflammatory marker & immunity 00:40:00

Inflammatory marker	Immunity
CRP, ESR, C3, C4	Immunocompromised state ↓ Cellular immunity ↓ Humoral immunity ↑

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Renal changes 00:40:55

- size ↑↑ - dlt ↑ vascularity
- HUN (R>L) – Dextrorotation & progesterone
- ↑ Bladder vascularity
- Oedema
- VUR

→ UTI

- Renal blood flow ↑
- GFR Increases

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Respiratory changes 00:43:25

IRV	Constant	I.C
TV	↑	
ERV	↓	EC
RV	↓	
Non pregnant	Pregnant	

I	R	V	Constant
R	R		
V	C		

IC ↓ Inspiratory capacity	M T V MV, TV	↑

- IC ↑
- EC constant
- Respiratory rate- same
- TV-increases
- Minute ventilation- increase
- TV*RR

FETAL SKULL

Bones in fetal skull

- 2 parietal bones
- 1 occipital bones
- 2 frontal bones

Prominent sutures

- Frontal suture
- Coronal suture
- Sagittal suture
- Lambdoid suture (posteriorly)

2 fontanelles

(Bregma) Anterior fontanelle ↓	Posteriorly fontanelle ↓
• Diamond shape • Size: 3x3 cm • Boundaries – Anteriorly: frontal suture – Lateral: coronoid suture – Posteriorly: sagittal suture • Closes by 12-18 months • Persistant > 24 months ↓ Needs evaluation	• Triangular shape • 1.5 x 1.5 cm • Ossify by birth

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Diameter 00:03:46

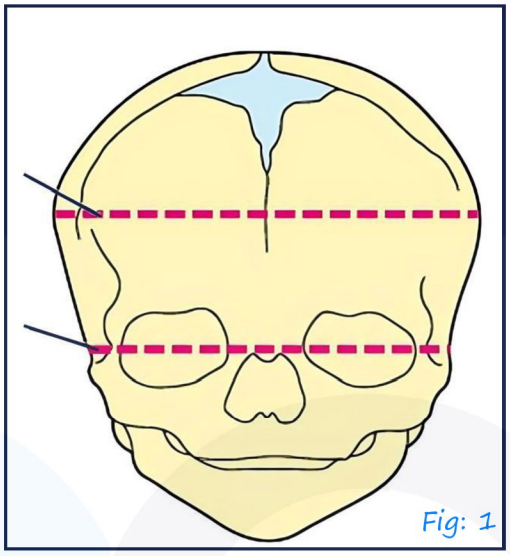

Fig: 1

Transverse diameter

- Bimastoid diameter (shortest)
  - Between 2 mastoid processes
  - 7.5 cm
- Bitemporal diameter
  - Between 2 temporal bones
  - 8.5 cm
- Biparietal diameter (longest)
  - Between the 2 prominent processes of parietal bone
  - 9.5 cm

Fetal skull diameters 00:05:31

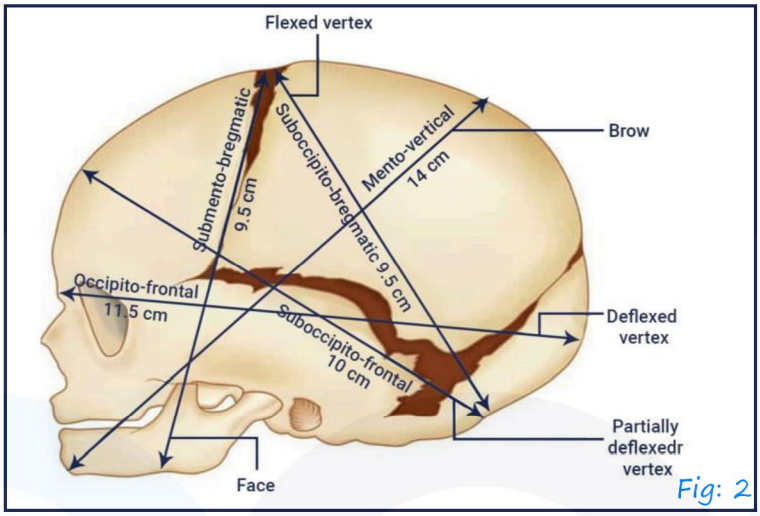

Fig: 2

1.Suboccipito bregmatic 9.5 cm

2.Submento bregmatic 9.5 cm

3.Mento vertical (longest) → 14 cm

4.Suboccipito frontal → 10cm

Attitude	Presentation	Measurements	Diameter
Complete extension	Face	9.5 cm	Submento bregmatic
Partial extension / military position	Brow	14 cm	Verticomental
Incomplete flexion	Vertex	10 cm	Suboccipito frontal
Complete flexion	vertex	9.5 cm	Suboccipito bregmatic

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Q. Presenting diameter of full flexed head?

A. Suboccipito – bregmatic diameter

B. Suboccipito – frontal diameter

C. Occipito – frontal diameter

D. Occipito – Posterior position

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MATERNAL PELVIS

- Maternal pelvis is made up of 3 bones
  - Hip bones → made of pubic bone
  - Sacrum ischium
  - Coccyx iliuro
- 3 joints in pelvic
  - Pubic symphysis (Cartilaginous joint)
  - Sacroiliac joint
  - Sacrococcygeal joint

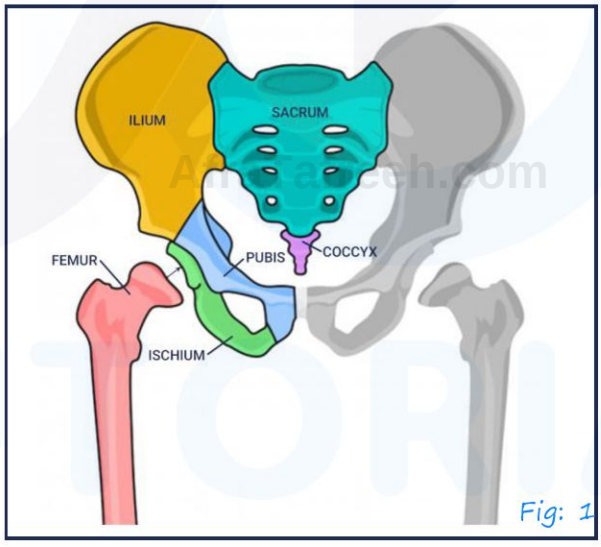
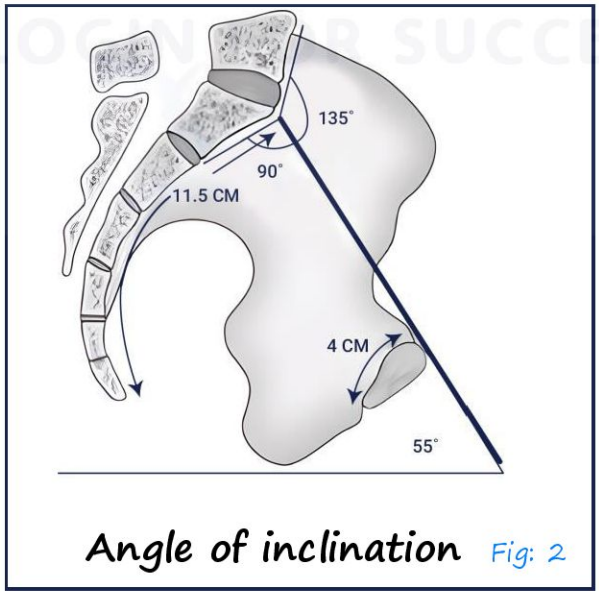


Fig: 1



Angle of inclination Fig: 2

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- Ⓝ angle of inclination is 550
- Angle is formed by the plane of pelvic inset with the horizontal

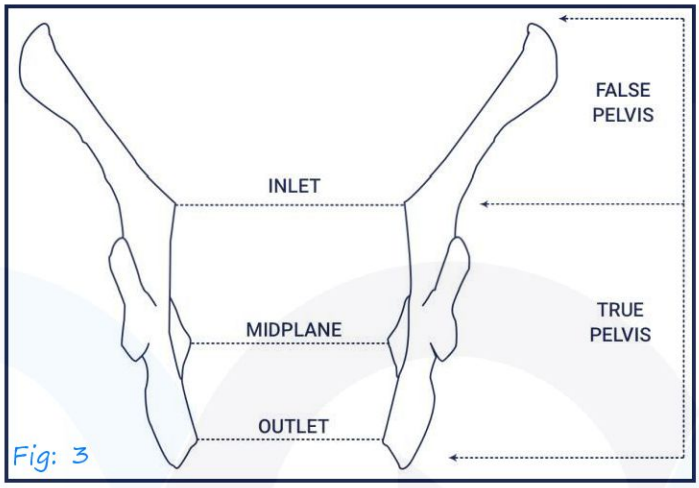


Fig: 3

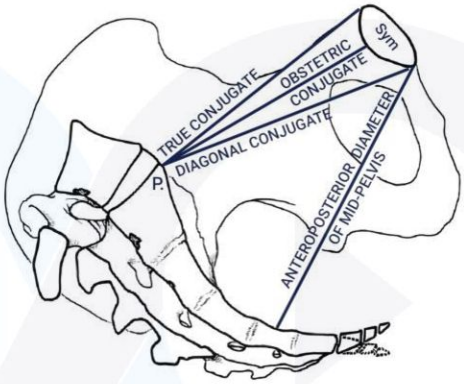
- Pelvic is divided into true pelvis and false pelvis
- Upper part of pelvis is greater pelvis of false pelvis
- Part of pelvis which is below pelvic brim is known as lesser pelvis or true pelvis
- True pelvis is divided into
  - Inset
  - Cavity
  - Outlet

Inset

- Transverse diameter – 13 cm
- Oblique diameter – 12 cm
- Anteroposterior diameter – 11 cm

Mid pelvis

- Both anteroposterior and transverse diameter are 12 cm each
- Transverse diameter – 11 cm
- Oblique diameter – 12 cm
- Anteroposterior diameter - 13 cm



Anteroposterior diameter

↓

3 in number

Fig: 4

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1.True conjugate (11cm)

2.Obstetric conjugate (Diagnose - 2) = 10cm

3.Diagonal conjugate (12 cm)

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Diagonal conjugate

- Only diameter that can be clinically measured
- From lower part of pubic symphysis till the sacral vertebrae

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Obstetric conjugate

- From most prominent or midpoint of pubic symphysis till sacral promontory
- Shortest diameter among the anteroposterior diameter
- This diameter is measured as Diagonal diameter – 2

True conjugate

- From top part of pubic symphysis till the sacral promontory
- Also known as anatomical conjugate
- This diameter is measured as Diagonal diameter – 2

Q True conjugate is?

1.Lower border of pubic symphysis to sacral promontory

2.upper border of pubic symphysis to sacral promontory

3.Posterior border of pubic symphysis to sacral promontory

Ans: 2

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Diameter		Length
AP	T	11 cm
	O	10 cm
	D	12 cm
Transverse	13	
Oblique	12	

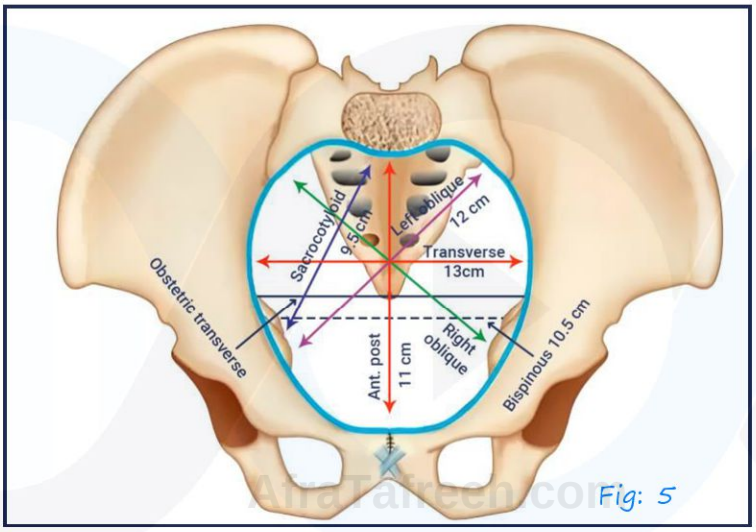

Fig: 5

Cavity

- Diameter between the ischial spines
  - Interspinous diameter
  - Shortest (10-10.5 cm)
- Place where there is plane of least pelvic dimension
- Place where deep transverse arrest can happen
- Place where station O is considered
- Place where internal rotation takes place
- Post saggital diameter (PSD)
  - Connects midpoint of interspinous line to sacrum
  - Ⓝ → 5cm

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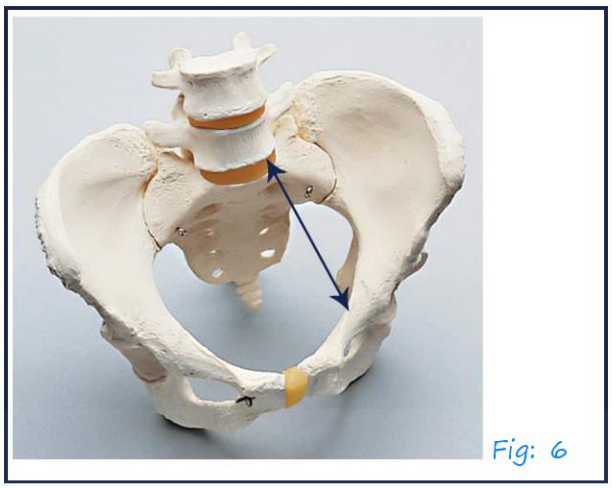

Fig: 6

- Anteroposterior diameter – 12 cm
- Interspinous + (PSD) = 15 cm

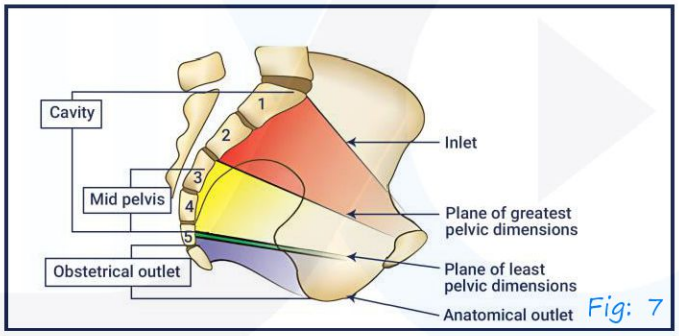

Fig: 7

Interspinous diameter

< 10.5 cm

↓

Contraction

< 8.0 cm

↓

Contracted pelvis

- two planes are present in cavity

PLANE OF GREATEST PELVIC DIMENSION

- Between the midpoint of pubic symphysis to the level of S2 and S3
- 12x12 cm

Plane of least pelvic dimension

- From lower part of pubic symphysis, posteriorly tip of sacrum, laterally, ischial spine
- 10.5cm – 11cm

OUTLET

- Transverse diameter – 11 cm
- Oblique diameter – 12 cm
- AP diameter – 13 cm
- Transverse diameter: between ischial tuberosity

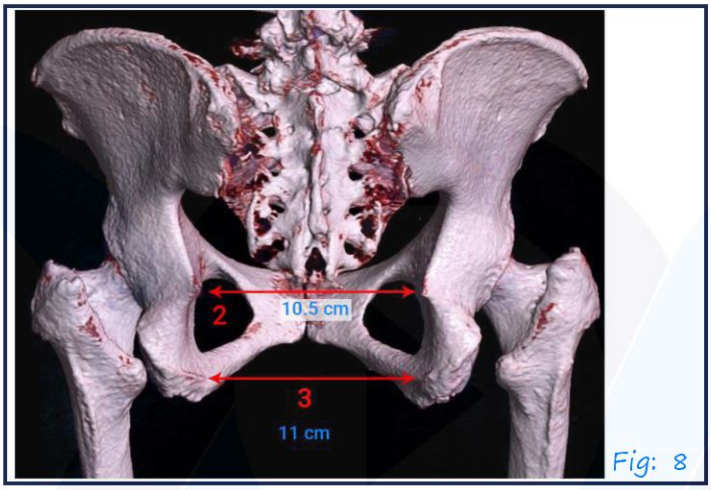

Fig: 8

Contracted pelvis 00:24:54

- Inset →
  - Shortest AP diameter < 10cm
  - Greatest transverse diameter <12cm
- Mid cavity
- Interspinous diameter – < 8cm
- ISD + PSD
- Outlet
- Inter tuberous diameter – < 8cm

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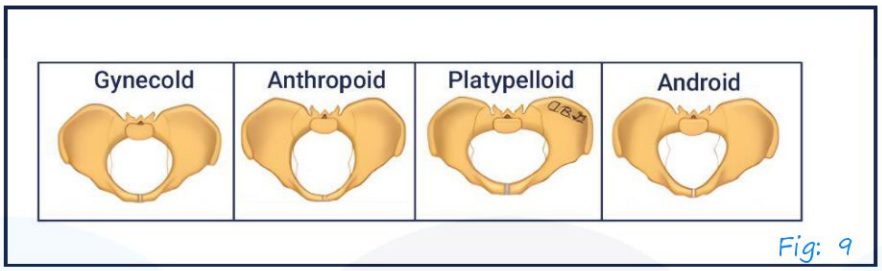
Types of pelvis 00:28:47

Caldwelmoloy classification

	Gynecoid	Anthropoid	Platypelloid	Android
	 Fig: 9			
Inset	Most common	25%	Least common 5%	20%
Side wall	Round – oval	Oval – AP	Oval transversely	Heart shaped
Side wall	Divergent	Divergent	Divergent	Convergent
Spine	Not prominent	Not prominent	Not prominent	Prominent
Subputic angle	Wide	Narrow	Wide	Narrow
Sacro sciatic notch	Wide	Wide	Narrow	Narrow

Q. Identify the area marked in green

A. Pelvic outlet

B. Anatomical outlet

C. Midpelvis

Ans: C

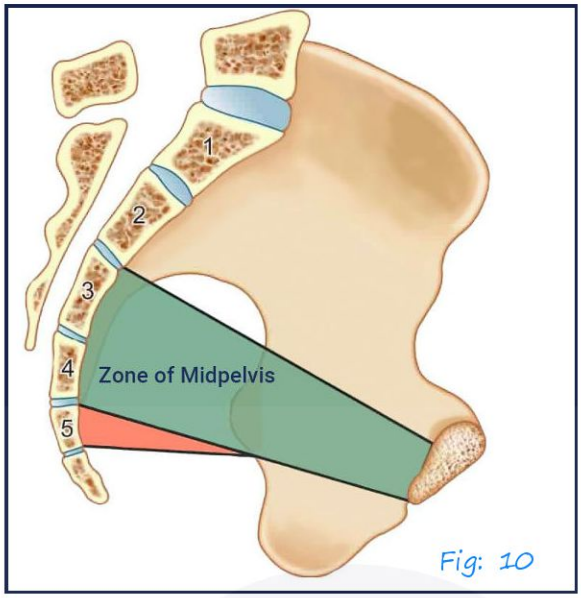


Fig: 10

Q. Identity the type of pelvis

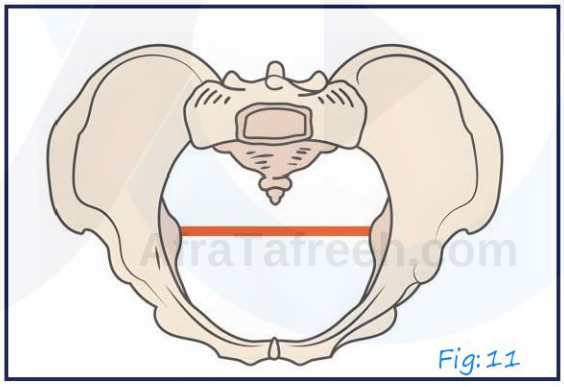


Fig:11

A. Anthropoid

B. Platypelloid

C. Android

D. Gynecoid

Ans: D

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PLACENTA – DEVELOPMENTAL ABNORMALITIES

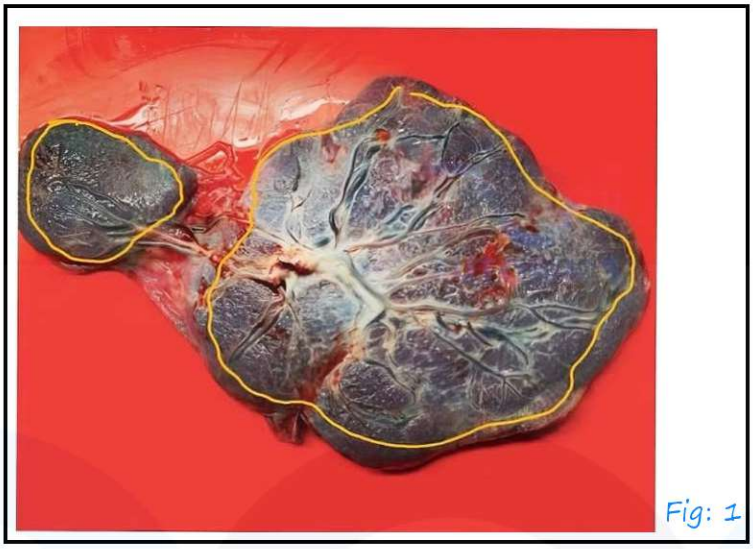


Fig: 1

- Placenta succenturiata

  ↓

  Complications

  - Post-partum hemorrhage
  - Subinvolution
  - Infection
  - Antenatally can cause vasa previa

    ↓

  - Placenta previa

LOGIN FOR SUCCESS

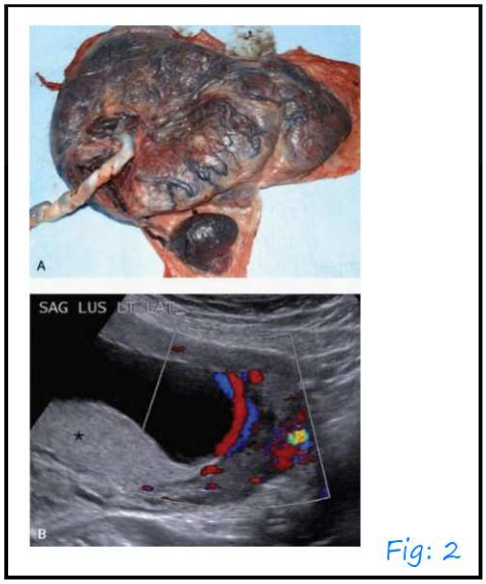


Fig: 2

Fig: 3

- Both lobes of placenta are of same size

↓

PLACENTA BILOBATA/BIPARTITE

↓

Complications are similar to placenta succenturiate

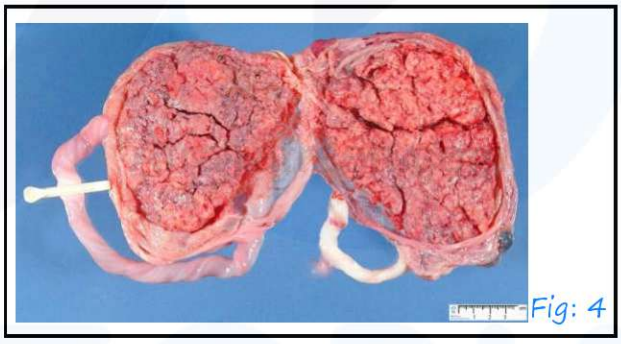


Fig: 4

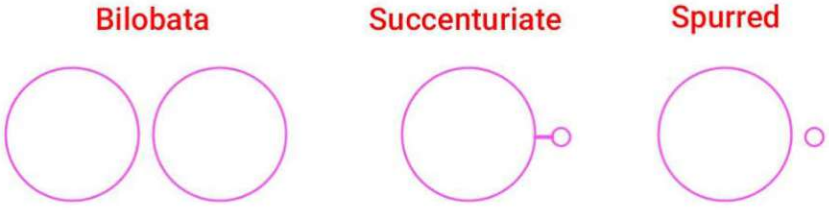
- Placenta of twin pregnancy

↓

2 umbilical cords

Placenta spuria 00:05:23

- Two placenta not connected by blood vessels



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Extrachorial placenta 00:06:24

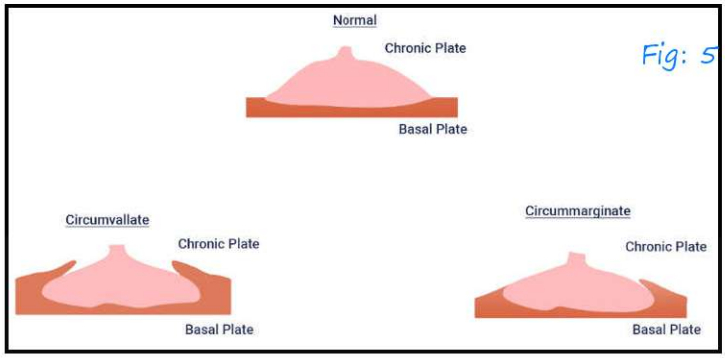


Fig: 5

- When basal plate > chorional plate → extrachorial placenta

2 types

Circumvallate	Circummarginate
↓	↓
Fold of amnion & chorion	Fibrin deposit
Fetal surface is depressed	Transition is smooth

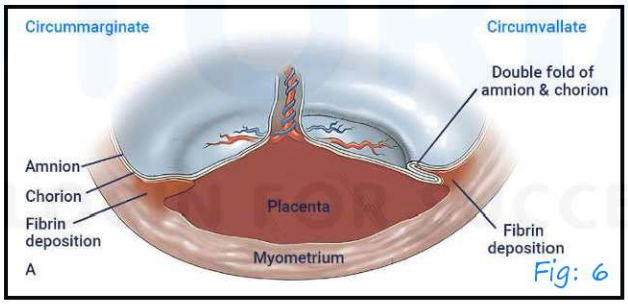
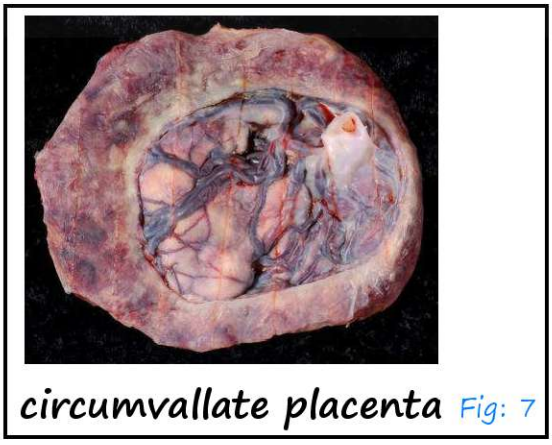
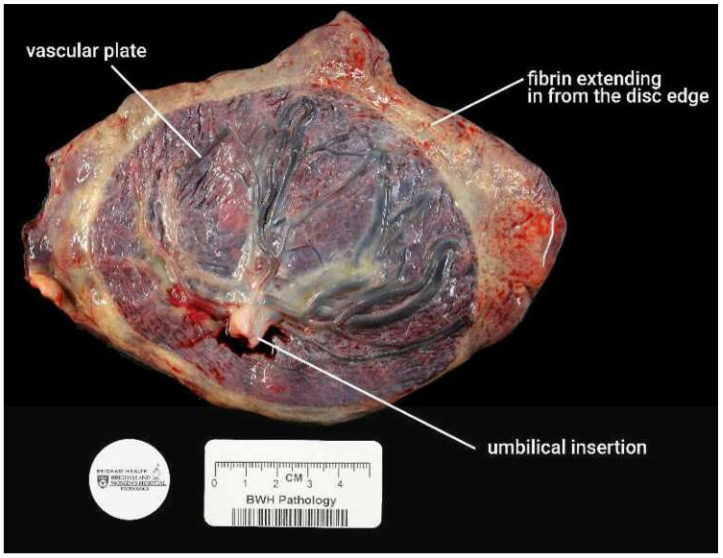


Fig: 6


circumvallate placenta Fig: 7



circummarginate placenta Fig: 8

Membranous placenta 00:10:50

- Also called as placenta diffusa.
- Diffuse layer of placenta through chorionic villi throughout the uterus
- Increased chance of past partum hemorrhage /retained placenta

Fenestrated placenta 00:12:05

- Part of placenta is absent

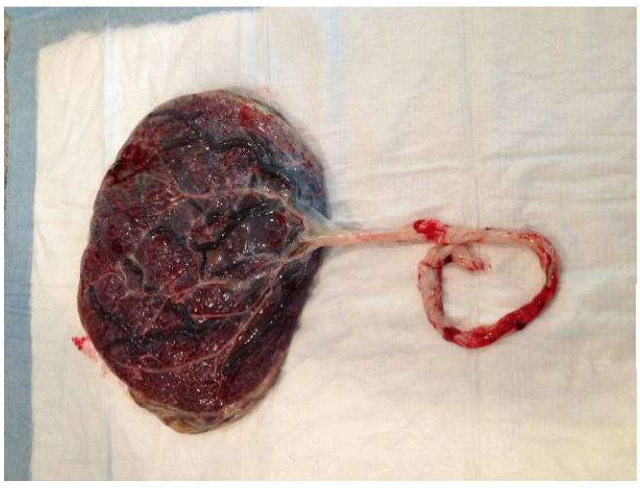


Fig: 9